Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of	)	
	)	
The 4.9 GHz Band Transferred from Federal Government Use	)	WT Docket No. 00-32
	)	

COMMENTS OF MOTOROLA

Motorola Inc. (hereinafter Motorola) submits these comments in response to the *Notice of Proposed Rule Making* in the above-captioned proceeding to adopt service rules for the 4940-4990 MHz (4.9 GHz) band.[1] As further discussed in these comments, one of the most interesting characteristics of the 4.9 GHz band is its close proximity to the Unlicensed National Information Infrastructure (U-NII) band at 5 GHz.[2] It is Motorola's opinion that the technologies deployed in the 4.9 GHz spectrum will be similar in technology and functionality to those deployed in the U-NII band. In addition, the 4.9 GHz band will provide benefits via the licensing process for those users for whom the use of unlicensed spectrum causes unacceptable problems due to the characteristics of their operations. Such users may include businesses and consumers as well as public safety.

I. The FCC's Rules Should Allow the Use of All U-NII Technologies

A hallmark of the past 10 years has been the explosive growth in the use of wireless communications technologies. This growth has occurred across all segments of

---

[1] *The 4.9 GHz Band Transferred from Government Use*, WT Docket No. 00-32, *Notice of Proposed Rule Making*, FCC 00-63, released February 29, 2000 [*hereinafter Notice*].

[2] The U-NII band is made up of 300 MHz of spectrum at 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.725-5.825 GHz. *See* 47 C.F.R. §15.401 *et seq.*

the user base, and for fixed as well as mobile applications. In many cases, this has led to large economies of scale in the manufacturing of equipment, and has resulted in lower prices for network operators and end users. In addition, it has led to the development of large networks with inherent values that grow by the square of the size of the network.[3] This has brought about an increased recognition of the value to the marketplace of standard, interoperable equipment. In many cases, for reasons of both cost and network-value, users with historically proprietary wireless solutions are expressing interest in the use of standard, commercial off-the-shelf technologies.

These facts are relevant in deciding what the final technical and operational rules should be for the 4.9 GHz band. While this band cannot yet be accessed for commercial purposes on a global scale,[4] the U-NII band is available to some extent in major information technology markets around the world. In the US, technologies being developed for and deployed in other unlicensed bands, such as IEEE 802.11 and HomeRF, are also targeting the 5 GHz U-NII band for future use. In Europe, the HIPERLAN specifications are being designed for use at 5 GHz, and in Japan the Multimedia Mobile Access Communication (MMAC) standards are being developed for the same band. On an international scale, the Bluetooth consortium also anticipates migrating later generations of its technology from the 2.4 GHz unlicensed band to the 5 GHz band. All of these standards focus on the provision of high data rates in a wireless

[3] This phenomenon is known as Metcalfe's Law. *See*, e.g., *Metcalfe's Law and Legacy* by George Gilder at http://www.forbes.com/asap/gilder/telecosm4a.htm.

[4] Motorola has not been able to determine whether this band is available for commercial use anywhere outside of the US.

local area or personal area network environment, and there is great promise for developing commonality among these standards.

The rules that the FCC implements for the 4.9 GHz band must not ignore these large global activities and marketplace trends. Manufacturers are unlikely to devote resources to developing specialized products for this band, and, even if so inclined, such products are becoming less appealing in the marketplace. The enormous international effort occurring to develop technologies for the 5 GHz bands means that, with rules properly crafted, the FCC can create an environment in the 4.9 GHz band that will be prepared to benefit from these large economies of scale, with only minor modifications.

II. Unlicensed Spectrum May Be Inappropriate For Certain Classes of Users

Applications that are envisioned for the 5 GHz around the world (U-NII spectrum in the US) are the wireless local area network (WLAN), the personal area network (PAN), and to some extent wide area fixed wireless access systems. A wireless LAN is a flexible data communication system implemented as an extension to, or as an alternative for, a wired LAN within a building or campus. These LANs minimize the need for wired connections and enable data connectivity with user mobility. Although PANs are similar from a technology perspective, their focus is on wireless devices that can form instant ad-hoc networks without any wired network connectivity and typically over shorter ranges. Since there are no wired components, the entire network can be moved from place to place as needed. Recently, WLANs have gained strong popularity in a number of vertical markets, including the health-care, retail, manufacturing, warehousing, and academic

markets. PAN technology, such as the emerging Bluetooth/802.15, is also anticipated to be highly popular within these same markets.

The power and flexibility of wireless LANs and PANs will likely result in numerous applications serving various industries and markets – including those for whom the use of unlicensed spectrum is inappropriate. In the US, the U-NII bands are secondary to government and non-government radionavigation uses, radiolocation uses, industrial, scientific and medical (ISM) uses, and, for some portions of the band, amateur radio uses. The governing principles of unlicensed spectrum use are that the users must be able to operate in the presence of interference generated by all other authorized (licensed or unlicensed) users of the band operating within the rules, and that they must not generate harmful interference into those users' operations.[5]

Through the use of robust modulations and well-designed protocols, the reliability of services deployed in unlicensed spectrum has steadily improved. In fact, the reliability is now such that service operators have been able to deploy systems for which end users are willing to pay to gain access. For mission critical applications in many fields, however, the potential for interference from either licensed or unlicensed devices is incompatible with the nature of the service required. Such applications might include:

- Distribution of medical information in real-time during a procedure within a hospital or at a trauma scene;
- A wireless LAN used to support a mission critical application (for example, customer service or ordering) in a corporate environment;
- Distribution of mission information within a police station or dispatch center or on scene in support of an event in progress.

[5] *See* 47 C.F.R. §15.5(b) of the Commission's rules.

- PANs for police officers and fire fighters that include cordless headsets that can network to two-way radios allowing dispatch voice and video to be relayed.

Therefore, while Motorola supports rules that promote similar technologies to be deployed in the 4.9 GHz band and the nearby 5 GHz U-NII bands, Motorola also supports distinguishing the 4.9 GHz band as a licensed band in order to support mission critical class of applications.

III. The Recently Allocated Public Safety Spectrum Does Not Satisfy All Needs of the Public Safety Community

As recognized in the *Notice*, 24 MHz of spectrum from reclaimed television broadcast spectrum in the 746-806 MHz band was recently allocated exclusively for Public Safety uses.[6] There is no question that this allocation is a "significant commitment of spectrum to serve public safety needs into the next century."[7] However, Motorola cautions the Commission against concluding that, because of this recent allocation, it is "unnecessary to set aside spectrum in the 4.9 GHz band for public safety use."[8]

Specifically, Motorola believes that there is still a need to consider additional public safety spectrum allocations in order to satisfy the requirements identified by the Public Safety Wireless Advisory Committee (PSWAC). The PSWAC Final Report identified a need for 95.3 MHz of new spectrum to be made available for Public Safety

[6] *Notice* at ¶ 26.

[7] *Id.*

[8] *Id.*

use in order to address anticipated demand through the year 2010.[9] While the 700 MHz allocation will help in satisfying the long-term voice, narrowband data, and some wideband data needs, it is important to remember the different types of services which drove the PSWAC spectrum requirements. Wideband data applications (*e.g.*, complex images, slow scan video, fingerprint and identification information) were responsible for 40.8 MHz of the predicted spectrum requirements, and 50.7 MHz of spectrum was for special data (*e.g.*, full scan color video).[10] The wideband channels in the 700 MHz band can be aggregated into, at most, 150 kHz channels. With aggressive modulation techniques these channels will enable applications requiring data rates in the range of hundreds of kilobits per second. Wireless LAN applications anticipate data rates comparable to those seen on wired LANs, which are on the order of tens of megabits per second.

WLAN, PAN, and other high data rate applications are the subject of international focus in the Public Safety community. In Europe, ETSI has initiated an activity named Digital Advanced Wireless Services (DAWS) covering IP based Broadband Mobile Services. The TIA APCO Project 34 has begun similar work in North America. Together, TIA and ETSI have received approval from the ETSI General Assembly to launch the Public Safety Partnership Project (PSPP), the purpose of which is to develop a wireless networking standard to fulfill the needs of the Public Safety and Law Enforcement Authorities in the area of very high bit-rate applications.

---

[9] Final Report of the Public Safety Wireless Advisory Committee, September 11, 1996, at §4.4.1. [*hereinafter, PSWAC Final Report*]

[10] *PSWAC Final Report* at §4.4.7.

Appropriate spectrum in which to deploy these kinds of applications for the Public Safety community does not become available that often. A recent allocation of spectrum for one class of Public Safety application should not, automatically, exclude Public Safety as a potential occupant of spectrum that can be used to provide a different class of essential service.

IV. Summary

A particular spectrum allocation will bring the most benefit to the public if it is managed such that manufacturers can develop products to enable services that provide cost effective communications solutions for the requirements of the markets being served. In the case of the 4.9 GHz band, this is most likely to occur if the market need for licensed versions of the technologies being designed for the unlicensed 5 GHz band is recognized by the FCC in the crafting of its rules. In addition, Motorola believes that the recently allocated Public Safety spectrum does not satisfy all the needs of the Public Safety community as documented in the PSWAC Final Report.

Respectfully Submitted

_____/S/_____
Richard C. Barth
Vice President and Director
Telecommunications Strategy
and Regulation
Motorola, Inc.
1350 I Street, NW
Washington, DC 20005
371-6900

_____/S/_____
Leigh M. Chinitz
Manager
Telecommunications Strategy
and Spectrum
Motorola, Inc.
1350 I Street, NW
Washington, DC 20005
(202) 371-6900

April 26, 2000